

Description

ASSEMBLY STRUCTURE OF A WASHING MACHINE'S CONSOLE, AND ASSEMBLY METHOD

Technical Field

- [1] The present invention relates to a washing machine, and more particularly, to an installation structure and method for a washing machine console.

[2]

Background Art

- [3] A washing machine is a home appliance for washing clothes automatically. A typical washing machine uses an electric motor as a driving unit to agitate clothes together with water containing detergent to remove dirt from the clothes. The washing process of the washing machine generally includes washing, rinsing, and drying operations.
- [4] Washing machines can be classified into a drum type washing machine, an agitator type washing machine, and a pulsator type washing machine.
- [5] The drum type washing machine includes projected lifters inside of a drum to lift up and drop down clothes in the drum as the drum is rotated about a horizontal axis at a low speed. Therefore, the clothes can be cleaned by the collision with water containing detergent.
- [6] The agitator type washing machine includes a propeller-like agitator projected from a bottom center of a tub. The agitator is rotated back and forth to wash clothes.
- [7] The pulsator type washing machine includes a disk-shaped pulsator to generate water flow to wash clothes.
- [8] Since washing machines of the related art are disclosed in Korea Patent Application No. 10-2002-0013602 and so on. Detail descriptions thereof will be omitted.
- [9] A washing machine of the related art includes a top cover and a console with a control panel on a top rear portion of the top cover. The console may be formed integral with the top cover. Alternatively, the console may be separately made and then mounted on the top cover using fasteners such as screws.
- [10] However, when the console is formed integral with the top cover, it is difficult to install inner parts of the console.
- [11] Further, when the console is formed separate from the top cover, another assembly process and additional parts such as screws are required, thereby complicating the assembly process and increasing the manufacturing cost.
- [12]

Disclosure of Invention

Technical Problem

[13] Accordingly, the present invention is directed to an installation structure and method for a washing machine console that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.

[14] An object of the present invention is to provide a structure and method for easily installing a console on a top cover of a washing machine.

[15]

Technical Solution

[16] To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described, there is provided a structure for installing a console to a washing machine, the structure including: a top cover formed on an upper side of the washing machine; a console to be installed on the top cover; a first coupling structure and a second coupling structure that are formed at the console; and a third coupling structure and a fourth coupling structure that are formed at the top cover and respectively correspond to the first and the second coupling structures for installation of the console on the top cover.

[17] According to another aspect of the present invention, there is provided a method for installing a console to a washing machine, the method including: preparing a top cover on a top of the washing machine, a console to be installed to the top cover, first and second coupling structures at the console, and third and fourth coupling structures at the top cover in association with the first and the second coupling structures; coupling the first coupling structure to the third coupling structure; and coupling the second coupling structure to the fourth coupling structure in association with the coupling between the first coupling structure and the third coupling structure.

[18]

Advantageous Effects

[19] According to the present invention, the console can be easily installed on the top cover of the washing machine owing to the installation structures such as a protrusion and a hook.

[20] Also, the present invention does not require a lot of parts or complicated structure for installing the console on the top cover of the washing machine, thereby decreasing the manufacturing cost and simplifying the manufacturing process.

[21]

Brief Description of the Drawings

[22] Fig. 1 is a perspective view of a washing machine with a console according to the present invention.

[23] Fig. 2 is a perspective view showing an installation structure of a console according

to a first embodiment of the present invention.

[24] Fig. 3 is an enlarged side view of the area encircled by line "A" in Fig. 2.

[25] Fig. 4 is a perspective view showing an installation structure of a console according to a second embodiment of the present invention.

[26] Fig. 5 is an assembled sectional view of the area encircled by line "B" in Fig. 4.

[27] Fig. 6 is a perspective view showing an installation structure of a console according to a third embodiment of the present invention.

[28] Fig. 7 is an assembled sectional view of the area encircled by line "C" in Fig. 6.

[29] Fig. 8 is a sectional view of a bottom hook of a console according to a fourth embodiment of the present invention.

[30] Fig. 9 is a perspective view showing an installation structure of a console according to a fifth embodiment of the present invention.

[31] Fig. 10 is an enlarged perspective view of the area encircled by line "D" in Fig. 9.

[32] Fig. 11 is an enlarged perspective view of the area encircled by line "E" in Fig. 9.

[33] Fig. 12 is a perspective view showing an installation structure of a console according to a sixth embodiment of the present invention.

[34] Fig. 13 is an enlarged perspective view of the area encircled by line "F" in Fig. 12.

[35]

Best Mode for Carrying Out the Invention

[36] Hereinafter, preferred embodiments of the present invention will be described in detail with reference to accompanying drawings.

[37] Fig. 1 is a perspective view of a washing machine with a console according to the present invention.

[38] Referring to Fig. 1, a washing machine 1 includes a case 2, a rear cover 3 on a back of the case 2, an outer tub 5 disposed in the case 2 to hold water.

[39] Further, the washing machine 1 includes an inner tub 4 and at least one water hole 6 defined in the inner tub 4. The inner tub 4 is disposed in the outer tub 5 to hold clothes, and the water hole 6 is defined to pass water therethrough.

[40] Further, the washing machine 1 includes a top cover 7 formed on a top of the case 2 and a drain hose 10 formed at a lower portion of the case 2 to drain water.

[41] Further, the washing machine 1 includes a driving motor (not shown) installed in a lower portion of the case 2 to drive the inner tub 4.

[42] The top cover 7 includes a top opening 11 to load and unload clothes and a lid 12 fixed on a top to open and close the top opening 11.

[43] The top cover 7 further includes a control panel 8 with a plurality of buttons on a top surface, a console 13 to receive the control panel 8, and an inlet hose 9 (two are shown) to receive water from an outer water source.

- [44] The top cover 7 may further include a shock absorbing member such as a rubber packing on a top surface to reduce damage to the lid 12 when the lid 12 is closed.
- [45] For the same reason, the lid 12 may also include a shock absorbing member such as a rubber packing on a bottom surface.
- [46] Each rubber packing may have a circular shape to effectively absorb shock when the lid 12 is closed.
- [47] An operation of the washing machine 1 will now be described.
- [48] First, a user opens the lid 12, puts clothes into the inner tub 4 through the top opening 11, and drops detergent onto the clothes.
- [49] Next, the user turns on the washing machine 1 by manipulating the control panel 8 to supply water to the outer tub 5 through the inlet hose 9. The water supplied to the outer tub 5 flows into the inner tub 4 through the water hole 6.
- [50] Then, the driving motor is operated to rotate the inner tub 4 back and forth to wash the clothes. After the washing operation, the contaminated water is drained through the drain hose 10.
- [51] Fig. 2 is a perspective view showing an installation structure of a console according to a first embodiment of the present invention, and Fig. 3 is an enlarged side view of the area encircled by line "A" in Fig. 2.
- [52] Referring to Figs. 2 and 3, the console 13 includes at least one front protrusion 18 on a bottom front surface and at least one rear protrusion 16 on a rear surface.
- [53] For coupling with the console 13, the top cover 7 includes a rear panel 15. The rear panel 15 couples to the back of the console 13 and defines at least one rear protrusion receiving slot 17 to receive the at least one rear protrusion 16 of the console 13.
- [54] Further, the top cover 7 includes a top panel 20 at a top. The top panel 20 defines at least one front protrusion coupling portion 19 to receive the front protrusion 18 of the console 13.
- [55] The rear protrusion 16 includes a top 21, a side 23, and a bottom 24. Also, the rear protrusion 16 includes corners 22 between the top 21 and the side 23 and between the side 23 and the bottom 24.
- [56] When the console 13 is coupled to the top cover 7, the front protrusion 18 is coupled to the top cover 7 and then the rear protrusion 16 is coupled to the top cover 7 while rotating the console 13 about the front protrusion 18. The front protrusion 18 may have a hook-like shape.
- [57] The rear protrusion receiving slot 17 may have the same or larger width than the rear protrusion 16 to smoothly receive it.
- [58] Also, the protrusion receiving slot 17 may be properly located to easily receive the rear protrusion 16.
- [59] The front protrusion coupling portion 19 is properly located to easily receive the

front protrusion 18.

- [60] The rear protrusion receiving slot 17 may be defined in or through the rear panel 15 of the top cover 7. The front protrusion coupling portion 19 may be a hole or a groove.
- [61] The top 21 and/or bottom 24 of the rear protrusion 16 may be substantially perpendicular to the rear surface of the console 13 to prevent the console 13 from shaking in up and down directions after the console 13 is fixed to the top cover 7.
- [62] The corners 22 of the rear protrusion 16 may be chamfered or rounded for easy insertion of the rear protrusion 16 into the rear protrusion receiving slot 17.
- [63] An installation operation of the console will now be described according to the first embodiment of the present invention.
- [64] First, the front protrusion 18 is coupled to the front protrusion coupling portion 19.
- [65] Next, the console 13 is rotated about the front protrusion 18 to seat it on the top panel 20 and rear panel 15.
- [66] When the back surface of the console 13 comes into contact with the rear panel 15, the rear protrusion 16 is inserted into the rear protrusion receiving slot 17. Therefore, the console 13 can be securely fixed to the top cover 7.
- [67] Here, the front protrusion 18 prevents the installed console 13 from shaking in front and back directions.
- [68] Also, the top 21 and/or bottom 24 of the rear protrusion 16 are respectively brought into contact with top and lower ends of the rear protrusion receiving slot 17 when the console 13 is installed on the top cover 7, such that the installed console 13 can be prevented from shaking in up and down directions.
- [69] Further, the rear protrusion 16, inserted into the rear protrusion receiving slot 17, prevents the installed console 13 from shaking in right and left directions.
- [70] That is, since the front protrusion 18 and rear protrusion 16 are respectively inserted into the front protrusion coupling portion 19 and rear protrusion receiving slot 17, the console 13 can be prevented from shaking after it is fixed to the top cover 7.
- [71] After fixing the console 13 to the top cover 7, at least one fastener such as a screw can be used to fix the console 13 to the rear panel 15 more securely.
- [72] Also, the fastener, though small in number, may more effectively prevent the installed console 13 from shaking.

[73]

Mode for the Invention

- [74] Hereinafter, other embodiments of the present invention will now be described with reference to accompanying drawings. Descriptions for the same parts as are described with reference to Figs. 1 to 3 will be omitted for conciseness.
- [75] Fig. 4 is a perspective view showing an installation structure of a console according

to a second embodiment of the present invention, and Fig. 5 is an assembled sectional view of the area encircled by line "B" in Fig. 4.

[76] Referring to Figs. 4 and 5, the console 13 includes an n-shaped bottom protrusion 25 at each bottom end.

[77] The top cover 7 includes a bottom protrusion coupling portion 26 formed on the top panel 20 for coupling with the bottom protrusion 25.

[78] The bottom protrusion 25 includes a support end 27, a connection portion 28 extended from the supporting end 27, and an insertion end 29 bent from the connecting portion 28 at a predetermined angle.

[79] The bottom protrusion coupling portion 26 includes a first bent portion 30 and a third bent portion 32 that are formed on the top panel 20. Also, the bottom protrusion coupling portion 26 includes a second bent portion 31 bent from the first bent portion 30, a fourth bent portion 33 bent from the third bent portion 32, and an insertion slot 34 defined between the second bent portion 31 and fourth bent portion 33.

[80] The bottom protrusion coupling portion 26 is raised from the top panel 20 at a predetermined height and it defines the insertion slot 34 along a center line.

[81] The bottom protrusion 25 and/or the bottom protrusion coupling portion 26 may be sized according to the design specification. Preferably, the bottom protrusion 25 and/or the bottom protrusion coupling portion 26 may be somewhat long for an effective coupling.

[82] The front protrusion 18 functions as a pivoting point when the console 13 is mounted on the top cover 7. The front protrusion 18 may have a hook-like shape.

[83] The insertion slot 34 receives the insertion end 29. For this, the insertion slot 34 may have the same or slightly larger width than the insertion end 29.

[84] Also, the insertion slot 34 is properly located for an each coupling with the insertion end 29.

[85] Further, the front protrusion coupling portion 19 is properly located for an easy coupling with the front protrusion 18.

[86] Further, the insertion slot 34 and/or the front protrusion coupling portion 19 may be holes or grooves for an easy coupling with the insertion end 29 and/or the front protrusion 18.

[87] Further, the first bent portion 30 and second bent portion 31 may be chamfered or rounded to allow an easy coupling of the bottom protrusion 25 with the bottom protrusion coupling portion 26.

[88] Though the support end 27 comes into contact with the first bent portion 30 when the bottom protrusion 25 is coupled to the bottom protrusion coupling portion 26, the present invention is not limited to this structure. In an alternative structure, for example, the support end 27 may come into contact with the third bent portion 32

when the bottom protrusion 25 is coupled to the bottom protrusion coupling portion 26.

[89] An installation of the console will now be described according to the second embodiment of the present invention.

[90] First, the front protrusion 18 is coupled to the front protrusion coupling portion 19 and then the console 13 is rotated about the front protrusion 18 to seat it on the top panel 20 and rear panel 15.

[91] When the bottom surface of the console 13 comes into contact with the top panel 20, the bottom protrusion 25 is inserted into the insertion slot 34 of the bottom protrusion coupling portion 26. Therefore, the console 13 can be securely fixed to the top cover 7.

[92] After the bottom protrusion 25 is inserted into the bottom protrusion coupling portion 26, the console 13 can be prevented from shaking in all directions.

[93] That is, the front protrusion 18 and the bottom protrusion 25 are respectively coupled to the front protrusion coupling portion 19 and the bottom protrusion coupling portion 26, such that the console 13 can be securely fixed to the top cover 7 without shaking.

[94] After fixing the console 13 to the top cover 7, at least one fastener such as a screw can be used to fix the console 13 to the rear panel 15 more securely.

[95] Also, the fastener, though small in number, may more effectively prevent the installed console 13 from shaking.

[96] Fig. 6 is a perspective view showing an installation structure of a console according to a third embodiment of the present invention, and Fig. 7 is an assembled sectional view of the area encircled by line "C" in Fig. 6.

[97] Referring to Figs. 6 and 7, the console 13 includes an n-shaped bottom hook 35.

[98] The top cover 7 includes a bottom hook coupling portion 36 on the top panel 20 for coupling with the bottom hook 35 of the console 13.

[99] The bottom hook 35 includes a support end 37, a connection portion 38 extended from the supporting end 37, an insertion end 39 bent from the connecting portion 38 at a predetermined angle, and a hooking portion 45 at an end of the insertion end 39.

[100] The bottom hook coupling portion 36 includes a first bent portion 40 and a third bent portion 42 that are formed on the top panel 20. Also, the bottom hook coupling portion 36 includes a second bent portion 41 bent from the first bent portion 40, a fourth bent portion 43 bent from the third bent portion 42, and an insertion slot 44 defined between the second bent portion 41 and fourth bent portion 43.

[101] The bottom hook coupling portion 36 is raised from the top panel 20 at a predetermined height and it defines the insertion slot 34 along a center line.

[102] The bottom hook 35 and/or the bottom hook coupling portion 36 may be sized

according to the design specification. Preferably, the bottom hook 35 and/or the bottom hook coupling portion 36 may be somewhat long for an effective coupling.

[103] The front protrusion 18 functions as a pivoting point when the console 13 is mounted on the top cover 7. The front protrusion 18 may have a hook-like shape.

[104] The insertion slot 44 receives the insertion end 39. For this, the insertion slot 44 may have the same or slightly larger width than the insertion end 39.

[105] Also, the insertion slot 44 is properly located for an each coupling with the insertion end 39.

[106] Further, the front protrusion coupling portion 19 is properly located for an easy coupling with the front protrusion 18.

[107] Further, the insertion slot 44 and/or the front protrusion coupling portion 19 may be holes or grooves for an easy coupling with the insertion end 39 and/or the front protrusion 18.

[108] Further, the first bent portion 40 and second bent portion 41 may be chamfered or rounded to allow an easy coupling of the bottom hook 35 with the bottom hook coupling portion 36.

[109] Further, hooking portion 45 of the bottom hook 35 may be smoothly formed to prevent breakage when it is inserted into the insertion slot 44.

[110] Though the support end 37 comes into contact with the first bent portion 30 when the bottom hook 35 is coupled to the bottom hook coupling portion 36, the present invention is not limited to this structure. In an alternative structure, for example, the support end 37 may come into contact with the third bent portion 42 when the bottom hook 35 is coupled to the bottom hook coupling portion 36.

[111] An installation of the console will now be described according to the third embodiment of the present invention.

[112] First, the front protrusion 18 is coupled to the front protrusion coupling portion 19 and then the console 13 is rotated about the front protrusion 18 to seat it on the top panel 20 and rear panel 15.

[113] When the bottom surface of the console 13 comes into contact with the top panel 20, the insertion end 39 is inserted into the insertion slot 44.

[114] Once the insertion end 39 is inserted into the insertion slot 44, the insertion end 39 is prevented from moving out of the insertion slot 44 by the hooking structure of the hooking portion 45 and the fourth bent portion 43. Therefore, the console 13 can be securely fixed to the top cover 7.

[115] Also, by coupling the bottom hook 35 to the bottom hook coupling portion 36, the console 13 can be prevented from shaking in all directions.

[116] That is, the front protrusion 18 and the bottom hook 35 are respectively coupled to the front protrusion coupling portion 19 and the bottom hook coupling portion 36, such

that the console 13 can be securely fixed to the top cover 7 without shaking.

[117] After fixing the console 13 to the top cover 7, at least one fastener such as a screw can be used to fix the console 13 to the rear panel 15 more securely.

[118] Also, the fastener, though small in number, may more effectively prevent the installed console 13 from shaking.

[119] Fig. 8 is a sectional view of a bottom hook of a console according to a fourth embodiment of the present invention.

[120] The same descriptions as those for the third embodiment shown in Figs. 6 and 7 will be omitted for conciseness.

[121] Referring to Fig. 8, a bottom hook 35 includes a connection portion 38 and an insertion end 46 bent from the connection portion 38.

[122] The bottom hook 35 further includes a pointed end 47 and an elastic extension 48. The pointed end 47 is formed at an end of the insertion end 46. The elastic extension 48 is extended from the pointed end 47 and it faces the insertion end 46.

[123] The pointed end 47 is pointed or tapered such that the bottom hook 35 can be easily inserted into the bottom hook coupling portion 36.

[124] To prevent the bottom hook 35 from moving out of the bottom hook coupling portion 36 after coupling, the insertion slot 44 may have a width smaller than the distance between the insertion end 46 and the elastic extension 48.

[125] That is, the elastic extension 48 and insertion end 46 approach each other when the bottom hook 35 is inserted into the insertion slot 44, and return to original position after the insertion. Therefore, the bottom hook 35 can be prevented from moving out of the bottom hook coupling portion 36 after it is inserted. The elastic extension 48 and/or the insertion end 46 may be made of elastic material.

[126] Fig. 9 is a perspective view showing an installation structure of a console according to a fifth embodiment of the present invention.

[127] Referring to Fig. 9, the console 13 includes at least one front protrusion 14 on a bottom front surface and at least one bottom protrusion 66 on a rear bottom surface.

[128] The top cover 7 includes at least one front protrusion coupling portion 65 and at least one bottom protrusion coupling portion 67 that is spaced apart from the front protrusion coupling portion 65. The at least one front protrusion coupling portion 65 is provided for coupling with the front protrusion 14, and the at least one bottom protrusion coupling portion 67 is defined in a top rear portion of the top cover 7 to receive the at least one bottom protrusion 66.

[129] When the console 13 is coupled to the top cover 7, the front protrusion 14 is coupled to the top cover 7 and then the bottom protrusion 66 is coupled to the top cover 7. The front protrusion 14 may have a hook-like shape.

[130] The front protrusion coupling portion 65 is properly located to easily receive the

front protrusion 14.

[131] The bottom protrusion coupling portion 67 and/or the front protrusion coupling portion 65 may be holes or grooves for an easy coupling with the bottom protrusion 66 and/or the front protrusion 14.

[132] Fig. 10 is an enlarged perspective view of the area encircled by line "D" in Fig. 9.

[133] Referring to Fig. 10, the front protrusion 14 includes a vertical portion 68 and a horizontal portion 69. The vertical portion 68 is protruded from a front bottom of the console 13 with a predetermined length, and the horizontal portion 69 is bent from the vertical portion 68 at a predetermined angle.

[134] The front protrusion coupling portion 65 includes an insertion hole 80 to receive the horizontal portion 69. Also, the front protrusion coupling portion 65 includes a fixing slot 81 extended from a side of the insertion hole 80 to receive the vertical portion 68. That is, the front protrusion 14 is inserted into the insertion hole 80 and then it is moved to the fixing slot 81, such that the front protrusion 14 can be fixed to the front protrusion coupling portion 65.

[135] To prevent the front protrusion 14 from shaking in front and back directions, the fixing slot 81 may have a width 75 equal to or slightly larger than a width 71 of the vertical portion 68.

[136] Further, to prevent the front protrusion 14 from shaking in up and down directions, a distance 70 between the horizontal portion 69 and the console 13 may be equal to or slightly larger than a thickness 74 of the front protrusion coupling portion 65.

[137] Further, to easily insert the front protrusion 14 into the insertion hole 80, a width 76 and a length 77 of the insertion hole 80 may be equal to or slightly larger than a width 72 and a length 73 of the horizontal portion 69, respectively.

[138] Further, for an effective coupling between the front protrusion 14 and the front protrusion coupling portion 65 without shaking, the horizontal portion 69 may be bent from the vertical portion 68 at a right angle.

[139] Fig. 11 is an enlarged perspective view of the area encircled by line "E" in Fig. 9.

[140] Referring to Fig. 11, the bottom protrusion 66 includes a body 78 projected from a bottom of the console 13 with a predetermined length and a head 79 on an end of the body 78.

[141] The top cover 7 includes the bottom protrusion coupling portion 67.

[142] The head 79 is formed to reduce friction when the bottom protrusion 66 slides on the top cover 7.

[143] Though the bottom protrusion 66 and bottom protrusion coupling portion 67 have circular shapes in this embodiment, they can have other shapes.

[144] An installation of the console will now be described according to the fifth embodiment of the present invention.

- [145] First, the horizontal portion 69 of the front protrusion 14 is inserted into the insertion hole 80 of the front protrusion coupling portion 65. Here, the head 79 of the bottom protrusion 66 comes into contact with the top cover 7.
- [146] Then, the console 13 is moved to insert the vertical portion 68 of the front protrusion 14 into the fixing slot 81. Here, the vertical portion 68 and horizontal portion 69 of the front protrusion 14 are brought into contact with corresponding wall surfaces of the fixing slot 81.
- [147] When the console 13 is moved to the fixing slot 81, the head 79 slides on the top cover 7 toward the bottom protrusion coupling portion 67 and then the head 79 and the body 78 are inserted into the bottom protrusion coupling portion 67. The inserted body 78 is tightly held in the bottom protrusion coupling portion 67, such that the console 13 can be fixed to the top cover 7 without shaking.
- [148] That is, by coupling the front protrusion 14 and bottom protrusion 66 to the front protrusion coupling portion 65 and the bottom protrusion coupling portion 67, the console 13 can be easily and securely fixed to the top cover 7.
- [149] After fixing the console 13 to the top cover 7, at least one fastener such as a screw can be used to fix the console 13 to the top cover 7 more securely.
- [150] Also, the fastener, though small in number, may more effectively prevent the installed console 13 from shaking.
- [151] Fig. 12 is a perspective view showing an installation structure of a console according to a sixth embodiment of the present invention.
- [152] Referring to Fig. 12, the console 13 includes at least one front protrusion 14 formed on a bottom front surface and at least one fastener fixing portion 108 defined in a rear bottom surface for coupling with a fastener such as a screw.
- [153] The top cover 7 includes at least one front protrusion coupling portion 65 and a rear panel 96. The rear panel 96 defines at least one fastener insertion hole 97.
- [154] The fastener insertion hole 97 corresponds to the fastener fixing portion 108, such that a fastener can be inserted through the fastener insertion hole 97 and coupled to the fastener fixing portion 108.
- [155] When the console 13 is coupled to the top cover 7, the front protrusion 14 is coupled to the top cover 7 and then a fastener is inserted through the fastener insertion hole 97. The front protrusion 14 may have a hook-like shape.
- [156] The front protrusion coupling portion 65 is properly located to easily receive the front protrusion 14.
- [157] The front protrusion coupling portion 65 may be a hole or a groove for an easy coupling with the front protrusion 14.
- [158] Fig. 13 is an enlarged perspective view of the area encircled by line "F" in Fig. 12.
- [159] Referring to Fig. 13, the front protrusion 14 includes a vertical portion 68 and a

horizontal portion 69. The vertical portion 68 is protruded from a front bottom of the console 13 with a predetermined length, and the horizontal portion 69 is bent from the vertical portion 68 at a predetermined angle.

[160] The front protrusion coupling portion 65 includes an insertion hole 80 to receive the horizontal portion 69. Also, the front protrusion coupling portion 65 includes a fixing slot 81 extended from a side of the insertion hole 80 to receive the vertical portion 68. That is, the front protrusion 14 is inserted into the insertion hole 80 and then it is moved to the fixing slot 81, such that the front protrusion 14 can be fixed to the front protrusion coupling portion 65.

[161] To prevent the front protrusion 14 from shaking in front and back directions, the fixing slot 81 may have a width 75 equal to or slightly larger than a width 71 of the vertical portion 68.

[162] Further, to prevent the front protrusion 14 from shaking in up and down directions, a distance 70 between the horizontal portion 69 and the console 13 may be equal to or slightly larger than a thickness 74 of the front protrusion coupling portion 65.

[163] Further, to easily insert the front protrusion 14 into the insertion hole 80, a width 76 and a length 77 of the insertion hole 80 may be equal to or slightly larger than a width 72 and a length 73 of the horizontal portion 69, respectively.

[164] Further, for an effective coupling between the front protrusion 14 and the front protrusion coupling portion 65 without shaking, the horizontal portion 69 may be bent from the vertical portion 68 at a right angle.

[165] An installation of the console will now be described according to the sixth embodiment of the present invention.

[166] First, the horizontal portion 69 of the front protrusion 14 is inserted into the insertion hole 80 of the front protrusion coupling portion 65.

[167] Then, the console 13 is moved to insert the vertical portion 68 of the front protrusion 14 into the fixing slot 81. Here, the vertical portion 68 and horizontal portion 69 of the front protrusion 14 are brought into contact with corresponding wall surfaces of the fixing slot 81.

[168] When the vertical portion 68 is fully inserted into the fixing slot 81, the fastener insertion hole 97 is aligned with the fastener fixing portion 108. Therefore, an additional fastener can be inserted through the fastener insertion hole 97 and fixed to the fastener fixing portion 108 in order to fix the console 13 to the top cover 7 more securely.

[169] That is, by coupling the front protrusion 14 to the front protrusion coupling portion 65 and attaching the fastener through the fastener insertion hole 97 into the fastener fixing portion 108, the console 13 can be easily and securely fixed to the top cover 7.

[170] Also, with this installation structure, the console 13 can be prevented from shaking

when it is once installed.

[171] While the present invention has been described and illustrated herein with reference to the preferred embodiments thereof, it will be apparent to those skilled in the art that various modifications and variations can be made therein without departing from the spirit and scope of the invention. Thus, it is intended that the present invention covers the modifications and variations of this invention that come within the scope of the appended claims and their equivalents.

[172]

Industrial Applicability

[173] According to the present invention, the installation process of the washing machine console can be simplified and the manufacturing cost of the washing machine can be reduced. Therefore, the present invention has a high industrial applicability.

[174]